In the Claims:

1-22. (Canceled)

23. (Previously Presented) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing an exogenous polypeptide forming a functional ion channel or transporter; and

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter;

thereby modifying the electrophysiological function of the excitable tissue region,

wherein expression of said exogenous polypeptide is regulatable by an endogenous or an exogenous factor.

24. (Original) The method of claim 23, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

25-27. (Canceled)

28. (Previously Presented) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing an exogenous polypeptide forming a functional ion channel or transporter; and

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter;

thereby modifying the electrophysiological function of the excitable tissue region,

wherein an ion permeability of said functional ion channel or an activity of said transporter is regulatable by an endogenous or an exogenous factor.

29. (Previously Presented) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing an exogenous polypeptide forming a functional ion channel or transporter;

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter; and

(c) regulating permeability of said functional ion channel or an activity of said transporter to thereby regulate the electrophysiological function of the excitable tissue region.

30. (Previously Presented) The method of claim 29, wherein said regulating said permeability or said activity is effected by administering an exogenous factor to the excitable tissue region.

31. (Previously Presented) The method of claim 23, wherein each implanted cell forms said functional ion channel or transporter following induction.

32. (Currently Amended) The method of claim 23, wherein the excitable tissue region forms a part of an organ selected from the group consisting of ~~a heart,~~ a pancreas, a kidney, a brain, and a liver.

33. (Previously Presented) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing an exogenous polypeptide forming a functional ion channel or transporter; and

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter;

thereby modifying the electrophysiological function of the excitable tissue region,

wherein the method is utilized for regulating cardiac arrhythmia.

34. (Canceled)

35. (Previously Presented) A method of modifying the electrophysiological function of an excitable tissue region of an individual, the method comprising:

(a) providing cells expressing an exogenous polypeptide forming a functional ion channel or transporter; and

(b) implanting said cells into the excitable tissue region, such that each implanted cell forms:

(i) gap junctions with at least one cell of the excitable tissue region; and

(ii) a functional ion channel or transporter;

thereby modifying the electrophysiological function of the excitable tissue region,

wherein the method is utilized for regulating neuronal discharge.

36-39. (Canceled)

40. (Previously Presented) The method of claim 23, wherein the method is utilized for regulating cardiac arrhythmia.

41. (Canceled)

42. (Previously Presented) The method of claim 23, wherein the method is utilized for regulating neuronal discharge.

43. (Previously Presented) The method of claim 28, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

44. (Previously Presented) The method of claim 28, wherein each implanted cell forms said functional ion channel or transporter following induction.

45. (Currently Amended) The method of claim 28, wherein the excitable tissue region forms a part of an organ selected from the group consisting of ~~a heart,~~ a pancreas, a kidney, a brain, and a liver.

46. (Previously Presented) The method of claim 28, wherein the method is utilized for regulating cardiac arrhythmia.

47. (Canceled)

48. (Previously Presented) The method of claim 28, wherein the method is utilized for regulating neuronal discharge.

49. (Previously Presented) The method of claim 29, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

50. (Previously Presented) The method of claim 29, wherein each implanted cell forms said functional ion channel or transporter following induction.

51. (Currently Amended) The method of claim 29, wherein the excitable tissue region forms a part of an organ selected from the group consisting of ~~a heart,~~ a pancreas, a kidney, a brain, and a liver.

52. (Previously Presented) The method of claim 29, wherein the method is utilized for regulating cardiac arrhythmia.

53. (Canceled)

54. (Previously Presented) The method of claim 29, wherein the method is utilized for regulating neuronal discharge.

55. (Previously Presented) The method of claim 33, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

56. (Previously Presented) The method of claim 33, wherein each implanted cell forms said functional ion channel or transporter following induction.

57-58. (Cancelled)

59. (Previously Presented) The method of claim 35, wherein said ion channel is selected from the group consisting of a sodium ion channel, a potassium ion channel, a calcium ion channel and a chloride ion channel.

60. (Previously Presented) The method of claim 35, wherein each implanted cell forms said functional ion channel or transporter following induction.

61. (New) The method of claim 23, wherein the excitable tissue region forms a part of a heart.

62. (New) The method of claim 28, wherein the excitable tissue region forms a part of a heart.

63. (New) The method of claim 29, wherein the excitable tissue region forms a part of a heart.

64. (New) The method of claim 23, wherein said cells have a pacemaker function and/or are used for rhythm control for atrial fibrillation.

65. (New) The method of claim 28, wherein said cells have a pacemaker function and/or are used for rhythm control for atrial fibrillation.

66. (New) The method of claim 29, wherein said cells have a pacemaker function and/or are used for rhythm control for atrial fibrillation.

67. (New) The method of claim 33, wherein cells have a pacemaker function and/or are used for rhythm control for atrial fibrillation.

68. (New) The method of claim 23, wherein said cells comprise fibroblasts.

69. (New) The method of claim 28, wherein said cells comprise fibroblasts.

70. (New) The method of claim 29, wherein said cells comprise fibroblasts.

71. (New) The method of claim 33, wherein said cells comprise fibroblasts.

72. (New) The method of claim 23, wherein said cells comprise myoblasts.

73. (New) The method of claim 28, wherein said cells comprise myoblasts.

74. (New) The method of claim 29, wherein said cells comprise myoblasts.

75. (New) The method of claim 33, wherein said cells comprise myoblasts.

76. (New) The method of claim 23, wherein said cells comprise endothelial cells.

77. (New) The method of claim 28, wherein said cells comprise endothelial cells.

78. (New) The method of claim 29, wherein said cells comprise endothelial cells.

79. (New) The method of claim 33, wherein said cells comprise endothelial cells.

80. (New) The method of claim 23, wherein said cells comprise astroglial cells.

81. (New) The method of claim 28, wherein said cells comprise astroglial cells.

82. (New) The method of claim 29, wherein said cells comprise astroglial cells.

83. (New) The method of claim 33, wherein said cells comprise astroglial cells.